



GENERATION 4 GPS SYSTEMS WITH QUICK FIX PSEUDORANGING (QFP)

Telonics is pleased to announce the upcoming release (1Q08) of **GENERATION 4 GPS Systems** designed for marine mammals and sea turtles. These fourth generation systems include the **Quick Fix Pseudoranging (QFP)** technology.

In addition to standard GPS fixing, GENERATION 4 GPS systems can obtain all the information necessary to fix **position in as short as a 5 second surfacing time**. All data necessary for postprocessing can be obtained from as few as four up to or as many as eight GPS satellites. These data can be compressed into a **single Argos uplink message**, transmitted, and recovered via the Argos System. The QFP message also includes one byte of **error protection**. In addition to the transmission via Argos all data are **stored on board in memory** on the Gen 4 unit for later direct download if that proves applicable. Recovered Argos data are postprocessed to obtain a **QFP position automatically by using Telonics Data Converter (TDC)**. TDC runs on the end user's standard PC and can accept data from the Argos Data Dissemination System, obtain all required ephemeris data, process and sort different types of data (dive information, standard GPS positions, and QFP positions) returned from the unit, and provide an Excel compatible report for the end user.

The Gen 4 unit is adaptive and can obtain standard high accuracy GPS positions when adequate surfacing time occurs. The unit can store all the GPS positions in memory and can compress up to 10 (ten) historical GPS positions in a single Argos message allowing a very efficient data transfer via the Argos System. In addition, because the deployed Gen 4 system knows its actual position the unit can precisely calculate Argos satellite overpasses and transmit **only when satellites are visible to the unit**. This results in a very high probability of data transfer and excellent throughput using Argos DCLS System, and very efficient use of the on-board battery.

The Gen 4 QFP unit is **fully user programmable using Telonics Product Programmer (TPP)** and is capable of using selected satellites or the entire constellation of satellites carrying the Argos DCLS packages. **The accuracy of standard GPS is approximately 10 meters and QFP accuracy is typically better than 75 meters.**

TAKE AWAY POINT...When surfacing characteristics prevent a standard GPS position from being obtained, the QFP alternative provides GPS positions at sea using a postprocessing technique on surface times as short as 5 seconds.

Note: "GPS aiding" is not required by a deployed unit at sea and therefore units can be used successfully anywhere in the world.

TDC Sample Report

Telonics Data Report										
CTN	000000B									
Comment	Sample Report									
Argos ID	99999									
Measurement Units			degrees	degrees	degrees	degrees	%	dives	seconds	degrees C
Resolution					0.000043	0.000043	0.782%			
Range Minimum					-90	-180	0%	0	0	-40
Range Maximum					90	180	100%	127	1023	70
Acquisition Time	Acquisition Start Time	Location Type	Argos Latitude	Argos Longitude	GPS Latitude	GPS Longitude	Underwater %	Dive Count	Max. Dive Duration	Temperature
2007.05.29 18:00:00	2007.05.29 18:00:00									9
2007.05.29 18:03:05*	2007.05.29 18:00:00	GPS-QFP			33.383800N	120.121200W				
2007.05.29 18:30:00	2007.05.29 18:30:00									10
2007.05.29 19:00:00	2007.05.29 18:00:00						32.844%	40	213	
2007.05.29 19:00:00	2007.05.29 19:00:00									10
2007.05.29 19:02:31*	2007.05.29 19:00:00	GPS			33.382750N	120.121000W				
2007.05.29 19:30:00	2007.05.29 19:30:00									10
2007.05.29 20:00:00	2007.05.29 19:00:00						54.600%	49	342	
2007.05.29 20:00:00	2007.05.29 20:00:00									11
2007.05.29 20:01:38*	2007.05.29 20:00:00	GPS			33.382750N	120.121000W				
2007.05.29 20:04:23	2007.05.29 20:04:23	Argos Class 2	33.382N	120.120W						
2007.05.29 20:30:00	2007.05.29 20:30:00									11
2007.05.29 21:00:00	2007.05.29 20:00:00						40.664%	38	301	
2007.05.29 21:00:00	2007.05.29 21:00:00									12
2007.05.29 21:00:08*	2007.05.29 21:00:00	GPS-QFP			33.382700N	120.121200W				
2007.05.29 21:30:00	2007.05.29 21:30:00									12
2007.05.29 22:00:00	2007.05.29 21:00:00						14.858%	18	158	
2007.05.29 22:00:00	2007.05.29 22:00:00									11
2007.05.29 22:23:50*	2007.05.29 22:00:00	GPS-QFP			33.381200N	120.121500W				

* - The delay between the Acquisition Start Time and Acquisition Time does not represent the GPS Time-To-Fix; the delay also includes any time the animal was submerged prior to obtaining the fix.

This sample report (from the Telonics Data Converter software) organizes data by the time of its acquisition. The report covers the time period from 18:00:00-22:03:50 and includes the following types of data:

- Argos positions. The Location Type column identifies the Argos Location Class.
- GPS positions taken every hour. The Location Type column identifies whether these positions are standard GPS or GPS-QFP.
- Dive data accumulated over each hour.
- Temperatures measured every 30 minutes.

The Acquisition Time and Acquisition Start Time columns show when measurements or positions were taken. For accumulated data types such as dive counts, these columns show the time period over which data was accumulated.

The remaining columns specify the actual data measurements or positions. Note that the report also specifies the following information for each data column: units of measurement, data resolution (when the unit needs to compress data for Argos transmissions), and the minimum and maximum values that may appear in the column.